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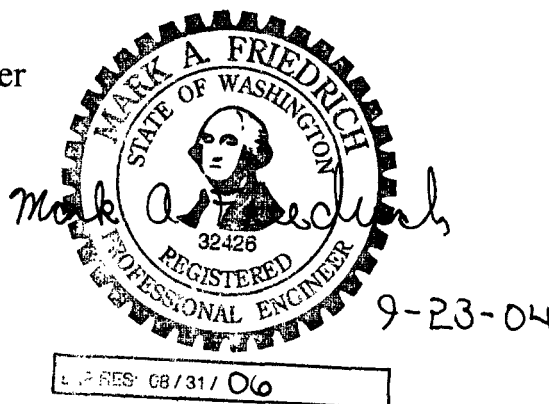
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Notice

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Acronyms and Abbreviations

Reference the *P&ID Symbols and Legend Sheets*, as listed in the Applicable Documents section, for acronyms and abbreviations employed on the attached figures.

AEA	<i>Atomic Energy Act of 1954</i>
AI	analog input
ASD	adjustable speed drive
ASX	autosampling system
DOE	US Department of Energy
HLW	high-level waste
JPP	jet pump pair
PJV	pulse jet ventilation system
PDI	pressure differential indicator
PDT	pressure differential transmitter
P&ID	pipng and instrumentation diagram
SS	safety significant
VSL	vessel
WAC	Washington Administrative Code
WTP	Hanford Tank Waste Treatment and Immobilization Plant

Glossary

Control system	This term refers to the electronic processors that perform regulatory and logic control functions necessary for normal operation of the plant.
feed forward control	Anticipatory control which tries to predict the effect on one part of the system due to a change in another and takes action to reduce the consequences to minimize the disturbances after they have occurred.
Pressure differential high	This term refers to a notification in the control system that is activated when high differential pressure setpoint has been reached.
Transfer-out	Coordinates the transfer out of a vessel by setting the appropriate valve alignment and facility communication.

1 Introduction

This document describes the instrument control logic for the ancillary equipment in the pulse jet ventilation system (PJV) within the high-level waste (HLW) facility associated with the dangerous waste permit.

2 Applicable Documents

24590-HLW-M6-PJV-P0001, *P&ID-HLW Pulse Jet Ventilation System*.

24590-HLW-M6-PJV-P0002, *P&ID - HLW Pulse Jet Ventilation Treatment System*.

WAC 173-303, *Dangerous Waste Regulations. Washington Administration Code, as amended*.

24590-HLW-3YD-PJV-00001, *System Description for HLW Pulse Jet Ventilation System (System PJV)*.

3 Description

The HLW PJV system plant items included in the dangerous waste permit are:

- PJV-HTR-00002 Pulse ventilation HEPA pre-heater
- PJV-HEPA-00004A PJV system HEPA Filter (primary)
- PJV-HEPA-00004B PJV system HEPA Filter (standby primary)
- PJV-HEPA-00005A PJV system HEPA Filter (secondary)
- PJV-HEPA-00005B PJV system HEPA Filter (standby secondary)
- PJV-FAN-00002A Pulse vent extraction fan
- PJV-FAN-00002B Pulse vent extraction fan

3.1 Function

Fluidic equipment is used for waste treatment operation to mix liquids and slurries in process vessels. Types of fluidics equipment include pulse jet mixers (PJM), transfer reverse flow diverters (RFD), and sampling RFDs. The PJMs mix fluids within a vessel; RFDs transfer process fluid out of a vessel, and sampling RFDs transfer process fluid to the autosampling system (ASX). Fluidics equipment exhaust produces emissions, as part of its normal operation, that must be contained and treated before discharge.

Fluidic equipment PJMs and RFDs use compressed air to force a vessel's process liquid to be mixed using the PJM or transfer out of a vessel via a RFD. Exhaust from the fluidic equipment into the PJV header is drawn through the PJV system electric pre-heater and high efficiency particulate air (HEPA) filter by a fan prior to emission discharge to the atmosphere through a dedicated PJV system stack.

The intent of the process control system is to maintain a vacuum in the PJV system relative to the surrounding cave. Pressure in the PJV system must be monitored to ensure that the system pressure

remains negative with respect to ambient pressure and ensures that the pressure limits for the PJV system are not exceeded.

Fluidic equipment creates flow rates of emissions, which vary over the various fluidics operation cycles. The total emissions flow rate varies depending on how the fluidics cycles combine at a particular time and the number of fluidics equipment operating at a particular time.

To control pressure limits, system pressure measurement is a feed forward signal to control exhaust fan speed, via the adjustable speed drive (ASD). The exhaust fan maintains the PJV system under a vacuum while emissions are discharged into the system from the fluidics equipment. The PJV fans, one operating and one in standby, draw emissions through the pre-heater, HEPA filters, and out to the atmosphere via a dedicated exhaust stack.

3.2 High Efficiency Particulate Air (HEPA) Filter System

The purpose of the HEPA filters is to provide high efficiency submicron particulate removal. The HEPA filters will be periodically tested for particulate removal efficiency to validate performance. Figure 1 shows the typical pressure differential instrument function and tag numbers listed in Table 1, which are associated with the HEPA filters.

Table 1. Associated Instrument Sensors for HLW PJV High Efficiency Particulate Air (HEPA) Filters

Instrument Tag Number	Associated Equipment	Description
PJV-PDT-3005	PJV-HEPA-00004A	pressure differential sensor
PJV-PDT-3006	PJV-HEPA-00005A	pressure differential sensor
PJV-PDT-3007	PJV-HEPA-00004B	pressure differential sensor
PJV-PDT-3008	PJV-HEPA-00005B	pressure differential sensor

Figure 1. Typical Pressure Differential Measurement for PJV High Efficiency Particulate Air (HEPA) Filters

